

## Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004-2005. For more information, please visit [www.landfire.gov](http://www.landfire.gov). Please direct questions to [helpdesk@landfire.gov](mailto:helpdesk@landfire.gov).

### Potential Natural Vegetation Group (PNVG):

R8PIECap

Appalachian Shortleaf Pine

### General Information

**Contributors** (additional contributors may be listed under "Model Evolution and Comments")

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**Vegetation Type**

Woodland

**Dominant Species\***

PIEC2 SCHIZ4

QUCO2

CAAL27

COFL2

**General Model Sources**

Literature

Local Data

Expert Estimate

**LANDFIRE Mapping Zones**

57 53

48 54

47 59

**Rapid Assessment Model Zones**

California

Pacific Northwest

Great Basin

South Central

Great Lakes

Southeast

Northeast

S. Appalachians

Northern Plains

Southwest

N-Cent.Rockies

**Geographic Range**

Widely distributed throughout the Southern Appalachians, Piedmont, Cumberlands as well as in the Interior Highlands and Coastal Plains. Generally at lower elevations (<3000 feet).

**Biophysical Site Description**

Found on a wide range of topographic positions but generally more gentle terrain. Generally dry, but not xeric sites. Often found on deeper sandy soils.

**Vegetation Description**

Shortleaf Pine woodlands can have a rich herbaceous understory. Some woody species particularly oaks and hickory with arborescent species such as dogwood and sourwood also present. With altered fire regimes, Mountain Laurel and less fire-adapted woody tree species such red maple and American Beech may be present. Shortleaf seed is very small, with very limited seed energy to establish roots in mineral soil and develop a top capable of photosynthesis before seed energy is expended. In addition, it is very shade intolerant and is easily suppressed in height growth with overhead shade in as little as one growing season.

**Disturbance Description**

Strongly fire-adapted. Mean fire-return intervals ranging from 3 to 10 years. Fire is the natural mechanism to prepare a seedbed and control woody species competition. Unlike white pine or Virginia pine, shortleaf re-sprouts if top-killed and is therefore capable of a gradual buildup of regeneration in a frequent fire regime. Other disturbance dynamics include weather (wind) and insects and disease. A very stable community under natural fire regimes. Shortleaf is susceptible to mortality caused by; southern pine beetle (SPB), lightning strike followed by black turpentine beetle, Ips beetle, littleleaf disease, and storm events. SPB and blowdowns remove the canopy over extensive areas providing the conditions needed for natural regeneration and thereby ecosystem sustainability, provided there has been a frequent light fire regime. Non-fire disturbances that can result in stand replacement include mortality from insects, disease (biotic) and

\*Dominant and Indicator Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

wind-weather related events (abiotic) e.g., windstorm and ice. In the absence of periodic fire, dense regeneration leads to overcrowded stands more likely predisposed to insects, particularly southern pine beetle (SPB) epidemics. Larger patches or regeneration 5 to 500 acres in size can occur in association with SPB outbreaks in the Southern Appalachians. Other bark beetles also attack these species but produce smaller patches (usually less than an acre) of mortality.

**Adjacency or Identification Concerns**

This PNVG is a part of NatureServe (2005) Ecological System CES202.332 Southern Interior Low Mountain Pine Forest. However, it is separated from Virginia pine in regard to the role of fire (Shortleaf Pine is strongly influenced by periodic low-intensity fire). It sometimes overlaps with NatureServe (2005) Ecological System CES202.331 Southern Appalachian Montane Pine Forest and Woodland (more often with Pitch Pine than with Table-Mountain Pine). Usually Shortleaf Pine is found at lower elevations, on more fertile soils and less extreme topography.

**Scale Description**

**Sources of Scale Data**  Literature  Local Data  Expert Estimate

Generally large patch. In woodland conditions, some smaller openings or regeneration will form following canopy disturbances.

**Issues/Problems**

Forest health problems (Southern Pine Bark Beetle epidemic conditions) coupled with altered fire regimes over time have greatly reduced the abundance of this community in its historic range.

**Model Evolution and Comments**

Based on the quality control process, mixed severity fire was added to Class C and Class D as a maintenance disturbance with a probability of 0.007. This created little change to resulting percent in each vegetation class, but did reduce the FRI to about 150 years.

Peer review results: wove reviewer comments into Vegetation Description and Disturbance Description. There is some redundancy, but often the context is slightly different. These descriptions may need to be streamlined during the LANDFIRE modeling process.

**Succession Classes**  
*Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).*

**Class A 10%**

Early1 All Structures

**Description**

Pine and oak reproduction up to 15 feet in height. Other woody and herbaceous species can include hickories, flowering dogwood, mountain laurel, blackberry and huckleberry and grasses.

**Indicator Species\* and Canopy Position**

- PIEC2 Upper
- QUCO2 Mid-Upper
- COFL2 Low-Mid
- CAAL27 Mid-Upper

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model 9**

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	1 %	10 %
Height	Shrub Tall >3.0 m	Tree Regen <5m
Tree Size Class	Sapling >4.5ft; <5"DBH	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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**Class B 10%**

Mid1 Closed

**Description**

Canopy closure excludes most herbaceous ground cover. Galax, pipsiewa can be present. Overstory components can include oaks and hickories.

**Indicator Species\* and Canopy Position**

PIEC2 Upper  
QUCO2 Mid-Upper  
COFL2 Low-Mid  
CAAL27

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model 9**

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	50 %	100 %
Height	Tree Regen <5m	Tree Short 5-9m
Tree Size Class	Pole 5-9" DBH	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

**Class C 30%**

Mid1 Open

**Description**

Canopies are relatively open with a grassy understory and/or other fire-adapted herbaceous vegetation. Pine dominates overstory but may also have oak and hickory.

**Indicator Species\* and Canopy Position**

PIEC2  
QUCO2  
CAAL27  
SCHIZ4

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model 9**

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	25 %	50 %
Height	Tree Regen <5m	Tree Short 5-9m
Tree Size Class	Pole 5-9" DBH	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

**Class D 40%**

Late1 Open

**Description**

Open park-like stand with grassy understories. Rich herbaceous understory with a limited amounts of woody midstory and understory (huckleberry, dogwood, oak, hickory).

**Indicator Species\* and Canopy Position**

PIEC2 Upper  
QUCO2 Mid-Upper  
CAAL27 Middle  
SCHIZ4 Lower

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model 9**

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	25 %	70 %
Height	Tree Short 5-9m	Tree Medium 10-24m
Tree Size Class	Medium 9-21"DBH	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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**Class E 10%**

Late I Closed

**Description**

Canopy closure with overstory tree crowns often touching each other. Overstory contains varying amounts of oak and hickory with a well-developed midstory that includes shade-tolerant, fire-intolerant woody vegetation. Species could include red maple, sassafras, sourwood, mountain laurel, blackgum, dogwood and, occasionally, red cedar and/or white pine.

**Indicator Species\* and Canopy Position**

PIEC2  
QUCO2  
COFL2  
ACRU

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model 9**

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	70 %	100 %
Height	Tree Short 5-9m	Tree Medium 10-24m
Tree Size Class	Medium 9-21"DBH	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

**Disturbances**

**Non-Fire Disturbances Modeled**

- Insects/Disease
- Wind/Weather/Stress
- Native Grazing
- Competition
- Other:
- Other:

**Fire Regime Group: 1**

- I: 0-35 year frequency, low and mixed severity
- II: 0-35 year frequency, replacement severity
- III: 35-200 year frequency, low and mixed severity
- IV: 35-200 year frequency, replacement severity
- V: 200+ year frequency, replacement severity

**Fire Intervals (FI):**

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class. All values are estimates and not precise.

**Historical Fire Size (acres)**

Avg: 500  
Min: 10  
Max: 5000

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	125			0.008	4
Mixed	155			0.00645	4
Surface	6			0.16667	92
All Fires	6			0.18112	

**Sources of Fire Regime Data**

- Literature
- Local Data
- Expert Estimate

**References**

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